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ABSTRACT

This report describes a study of the classroom implementation of seven Follow Through sponsors' models to assess whether or not planned variation exists and to investigate the impact on child achievement tests of the various classroom processes or procedures used by the different sponsors. The sample represents approximately 20 first grade and 20 third grade classrooms for each of seven Follow Through sponsors, at five or more sites per sponsor. Program implementation in the classroom is judged on the basis of the extent to which a sponsor's classrooms are found to be uniform on selected implementation variables, and the extent to which they differ from the traditional non-Follow Through classrooms on the same set of variables. The following were observed in the classrooms: (a) methodology used in the study of implementation, (b) implementation findings, (c) child behavior, (d) test scores, and (e) results of analysis of variance study. Findings show that the educational practices employed in Follow Through classrooms seem to be resulting in predictable and desired outcomes for the children. The author concludes that the Follow Through program of planned variation is being successfully implemented, and that the seven sponsored models considered in this report are each working to the advantage of children--not by chance but by careful design. (PD)

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WHAT TEACHERS DO DOES MAKE A DIFFERENCE--
A STUDY OF SEVEN FOLLOW THROUGH EDUCATIONAL MODELS

by

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Presented to the
Early Childhood Conference on Evaluation
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WHAT TEACHERS DO DOES MAKE A DIFFERENCE--
A STUDY OF SEVEN FOLLOW THROUGH EDUCATIONAL MODELS

Do classroom practices make a difference in how children grow and develop? In order to answer this kind of question, the government over the past seven years has funded a group of planned educational experiments. A variety of educational theories have been put into practice in a program called Follow Through Planned Variations.

The program began when researchers and other educational stakeholders were invited by the government to submit plans for establishing their various teaching models in public schools in order to test whether their individual approaches could improve the educational achievement of economically disadvantaged children. From the group that came forward, 22 eventually were selected to implement their programs as Follow Through program sponsors. Although it varied somewhat from year to year, ultimately sponsor models were implemented in 154 Follow Through projects within 136 urban and rural communities in all regions of the country.

The theory and practices proposed by the various educational sponsors were quite diverse, and from the inception of the program in 1969, government agencies and educators have been asking: "Does planned variation exist, and, if so, how do the planned educational programs affect children?"

The purpose of a report just completed was to study the classroom implementation of seven Follow Through sponsors' models to assess whether or not planned variation does exist. Since previous Follow Through observation studies were limited to one or two sites per sponsor, few generalizations could be made regarding the sponsor's performance at other sites. Realizing that a study of greater scope was needed in order to assess a sponsor's ability to implement his model in sites with different characteristics, the Office of Education commissioned the present

study. In addition to assessing the implementation of the Follow Through sponsors' programs in the classrooms, SRI also investigated the impact on child achievement tests of the various classroom processes or procedures used by the different sponsors.

The data presented in this report were collected in the spring of 1973 in 36 project locations. The sample represents approximately 20 first grade and 20 third grade classrooms for each of seven Follow Through sponsors, at five or more sites per sponsor.* Program implementation in the classroom is judged on the basis of two criteria: (1) the extent to which a sponsor's classrooms are found to be uniform on selected implementation variables, and (2) the extent to which a sponsor's classrooms differ from the traditional Non-Follow Through classrooms on the same set of variables.

A. Classroom Implementation

1. Methodology Used in the Study of Implementation

The first step in the assessment of classroom implementation was to describe each educational model in detail. The model descriptions were prepared by SRI and reviewed by the sponsors and then revised according to the sponsor's specifications. With assistance from the Follow Through sponsors, the second step was to create variables from the codes in Classroom Observation Instrument developed by SRI staff. These variables described representative elements of each model. Each sponsor was sent the list of variables relevant to his model and asked to rate each variable according to: (1) its importance to his model; and (2) the frequency with which the variable was expected to occur relative to a

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*These sponsors of educational models were observed in Spring 1973: Far West Laboratory for Educational Research and Development (5 sites), University of Arizona (6 sites), Bank Street College of Education (5 sites), University of Oregon (5 sites), University of Kansas (5 sites), High/Scope Educational Research Foundation (5 sites), and Education Development Center (5 sites). These sponsors were chosen for observation because they met the criterion of having five or more sites being implemented.

conventional classroom. Thus, a list of variables was selected for each of the seven models. Admittedly, the critical list of variables describes a sponsor's model only in part and there is considerable overlap in the critical variables of the sponsors (see Table 1). Some of the important subtle processes of the programs, such as developing intrinsic motivation or concepts of time and space, have not been assessed. Reducing a model to a list of variables can provide only a partial picture of implementation.

Since the Follow Through programs are intended to be innovative and to represent alternatives to the conventional classroom, a pool of Non-Follow Through classrooms was used as the standard from which Follow Through classrooms were expected to differ in specified ways. The standards were established separately for first and third grades.

For each sponsor's classroom, an implementation score was computed for each variable of each sponsor. Table 2 illustrates the computation for one variable, "Wide Variety of Activities," for one sponsor (Far West Laboratory). A total implementation score for each classroom was also computed.

To measure how well each Follow Through sponsor's model is implemented in the classrooms, a total implementation score was computed for each Non-Follow Through classroom on each sponsor's set of implementation variables. The mean and standard deviation of the Non-Follow Through pooled classrooms were reported for each sponsor. Significance tests were made separately for first and third grades to show the differences between each Follow Through sponsor's classrooms and the Non-Follow Through classrooms.

2. Implementation Findings

Implementation was judged on two criteria: (1) Were the sponsors different from the comparison or Non-Follow Through classrooms? (2) Were the classrooms of a sponsor similar to each other in the frequency of specified processes used? On the first criterion, all seven

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Table 1

LIST OF CRITICAL VARIABLES SELECTED BY SPONSORS

Variables Description	Far West Labs	University of Arizona	Bank Street	University of Oregon	University of Kansas	High Scope	EDC
Child selection of seating and work groups	X	X	X				
Games, toys, play equipment present	X	X	X			X	X
General equipment, materials present	X					X	X
Guessing games, table games, puzzles		X			X		X
Numbers, math, arithmetic		X			X	X	
Reading, alphabet, language development	X	X	X	X	X	X	X*
Sewing, cooking, pounding	X	X	X	X	X	X	X*
Blocks, trucks		X				X	
Practical skills acquisition						X	
Wide variety of activities, over one day			X				
Teacher with one child	X	X	X			X	X
Teacher with two children	X	X	X			X	
Teacher with small group			X				
Aide with one child		X	X	X	X	X	
Aide with small group	X		X				
One child independent		X		X	X	X	
Two children independent	X	X	X				X
Small group of children independent							X
Math or science equipment/Academic Activities	X		X				X
Texts, workbooks/Academic Activities	X		X			X	X
Child to adult, all verbal except response				X	X		
Individual child verbal interactions with adult			X				
Child questions to adults	X	X	X	X	X	X	X
Child group response to adult academic commands/requests or direct questions	X	X	X			X	X
Child presenting information to a group				X			
Adult instructs an individual child			X			X	
Adult instructs a group	X						X
Adult task-related comments to children				X			
All adult academic-talent to children						X	X
All adult praise to children	X		X	X	X	X	
Adult feedback to child response to adult academic commands/requests, questions		X		X	X		
Adults attentive to a small group				X	X		
Adults attentive to individual children	X			X		X	
Positive behavior, adults to children	X	X	X		X	X	
Total academic verbal interactions	X	X	X				
Adult communication or attention focus, one child				X			
Adult communication or attention focus, small group	X		X		X	X	X
Adult movement				X		X	
All child open-ended questions	X						
Adult academic commands/requests and direct questions to children							X
Adult open-ended questions to children				X	X		
Adult response to child's question with a question	X	X	X			X	X
Child's extended response to questions						X	X
All child task-related comments		X	X				
All adult positive corrective feedback	X	X				X	
All child positive affect	X			X	X		
All adult reinforcement with tokens	X	X					X
Child self-instruction, academic					X		
Child self-instruction, objects				X*			
Child task persistence			X			X	X
Two children working together, using concrete objects			X		X	X	
Small group working together, using concrete objects						X	
Social interaction among children			X			X	
Child movement	X		X				X
Child self-instruction, nonacademic	X						X
	X	X				X	
Total number of Critical Variables	27	21	27	16** 17*	17	29	20** 22*

* Third grade only.

** First grade only.

Table 2

WIDE VARIETY OF ACTIVITIES, OVER ONE DAY (Variable 83)

Sites	First Grade Classrooms with Implementation Scores of					Third Grade Classrooms with Implementation Scores of				
	Poor	Fair	Good	Very Good	Exc.	Poor	Fair	Good	Very Good	Exc.
Berkeley, Calif.				4					1	3
Duluth, Minn.				3	1				1	3
Lebanon, N.H.					4					4
Salt Lake City, Utah					4			1	1	2
Tacoma, Wash.					4			2	1	1
Total Classrooms				3	17			3	4	13
Percent of classrooms				15%	85%			15%	20%	65%

of the sponsors' implementation mean scores for both grade levels differed significantly from the Non-Follow Through classroom means. For the most part, on the second criterion the 20 first grades and 20 third grades of each sponsor appeared remarkably similar regardless of the site. There were some instances for some sponsors where one site or one or two classrooms had implementation scores as low or in one case lower, than Non-Follow Through. However, considering the diverse locations and the enormous task of making educational theory come alive consistently in the classrooms, we conclude that the seven models have been implemented to a remarkable degree.

B. Classroom Processes and Child Outcomes

The study of implementation would be of little importance if we did not believe that differing educational theory and practices affect children differently.

Like educators in general, Follow Through sponsors feel that the development of basic skills in reading and computing is important, but that it is also desirable for children to develop such attributes as task persistence, attending ability, cooperation, inquiry behavior, and independence. While these attributes appear to be illusive, we have been able to operationally define and systematically observe some of these behaviors.

1. Child Behavior

In a study based on 105 first grade classrooms observed and tested in Spring 1973, we are finding some interesting relationships between classroom processes used by the teacher and observable behaviors on the part of the children. These relationships have been adjusted to take account of entering ability. The classroom process data were collected on two days separate from the observed child behaviors. We do not know whether the findings are causal relations, but they do suggest

hypotheses to test. The desirable child behaviors that will be discussed in this paper are independence, task persistence, cooperation, and question asking. Twenty eight classroom process variables were correlated with these child behaviors.

In our study, independence is defined as a child or children engaged in a task without an adult. This type of independent behavior is more likely to be found in classrooms where teachers allow children to select their own seating and groups part of the time, where a wide variety of activities are available, and where an assortment of audiovisual and exploratory materials are available (see Table 3). The adults provide individual attention and make friendly comments to the children.

Fewer independent children are found in classrooms where textbooks and workbooks are used relatively more frequently. Fewer independent children are found in classrooms where adults ask relatively more direct questions regarding the subject matter. Fewer independent children are found in classrooms where adults praise children a lot (the variable describes praise in general, not for specific tasks or achievement).

The negative relationship of praise with independence is very high. This finding appears to support John Holt's description in How Children Fail* of the child who is dependent upon teacher's praise. Holt says such a child is a "teacher watcher"--he has his ear pitched to hear what the teacher wants rather than behaving independently in relation to his own thoughts or tasks. This suggests that if teachers want to help children become independent in working on tasks, they should use praise sparingly and specifically.

However, praise does not affect all outcome measures in the same way. There is a positive correlation of praise for academic achievement with reading and math scores. A more thorough study of the relationship of praise to achievement in math showed that first grade children in classrooms where the average entering ability was low had achievement scores in math that were more positively related to praise than were

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*Holt, John, How Children Fail, Pitman Publishing Corp., New York, 1964.

Table 3

PARTIAL CORRELATIONS OF INSTRUCTIONAL VARIABLES AND CHILD BEHAVIORS

(Fall 1971 WRAT partialed out)

Instructional Variables	Independence		Task Persistence		Cooperation		Child Questions	
	Correlation	Significance level	Correlation	Significance level	Correlation	Significance level	Correlation	Significance level
Child/Adult Ratio	.23	.02	.09		.02		-.15	
Children Select Groups and Seats Part of the Time	.36	.001***	-.22	.03	.19	.05	.03	
Instructional Materials Used	-.01		.11		.09		-.07	
Audio Visual Equipment Used	.13		-.25	.01	.15		-.12	
General Equipment and Materials	.22	.02	-.08		.09		.005	
Total Resource Materials Used	.13		-.23	.02	.18		.03	
Wide Variety of Activities Occur Concurrently	.22	.03	-.12		.15		.09	
Wide Variety of Activities Occur During the Day	.43	.001	-.36	.001	.32	.002	.14	
An Adult with One Child	.57	.001	-.16		.08		.14	
Use of TV	-.03		-.10		-.11		-.03	
Audio Visual Equipment Used in Academic Subjects	.24	.01**	-.25	.01	-.01		-.04	
Exploratory Materials Used in Academic Subjects	.34	.001	-.22	.03	.27	.006	-.11	
Math or Science Equipment Used in Academic Subjects	-.18		.17		-.18		.11	
Textbook and Workbooks Used in Academic Subjects	-.33	.001	.31	.002	-.49	.001	-.04	
Puzzles and Games Used in Academic Subjects	.16		-.07		.09		-.07	
Adults Asking Children Questions	-.17		.03		-.17		-.04	
Adult Instructs an Individual Child	-.09		.23	.02	-.17		.22	.05
Adult Comments to Children	.22	.03	-.12		-.13		.36	.001
Adult Task Related Comments to Children	.12		-.24	.02	.39	.001	-.16	
Adult Acknowledges Children	-.16		.15		-.11		.04	
Adult praises Children	-.60	.001	.20	.05*	-.21	.03	.02	
Adult Speaks to One Child	-.01	NS+	.13		-.06		.38	.001
Adult Speaks to Two Children	.29	.003	-.13		.28	.004	-.03	
Adult Speaks to a Small Group	-.15		.19	.05	.01		-.32	.001
Adult Asks Direct Question about Subject Matter	-.41	.001	.07		-.28	.005	.03	
Adults Ask Open-ended Thought-Provoking Questions	.16		-.12		.13		-.07	

\+ NS = Not significant
* .05 = 5 chances in 100 that the relationship would occur by chance.
** .01 = 1 chance in 100 that the relationship would occur by chance.
*** .001 = 1 chance in 1000 that the relationship would occur by chance.

Note: Number of classroom units used in the correlation computations = 102.

first grade children in classrooms where the entering ability was higher. Third grade children were less affected by praise.

The next dimension we will consider is task persistence. For this study, task persistence is defined as a child engaged in self-instruction over a designated period of time (a matter of a few minutes or more). If the child becomes engaged in a conversation with someone else during the task, task persistence is no longer present, and the observer no longer codes task persistence. The highest positive relationships indicate that task persistence occurs most often when textbooks and workbooks are used in the classroom. Where adults instruct one child at a time, the children are also likely to be more task persistent. This may be because young children often have difficulty understanding group instructions. However, in settings where adults work on a one-to-one basis, children can have a question answered or directions clarified and then persist in the task at hand.

For this study, cooperation is defined as two or more children working together on a joint task. This kind of cooperation is more likely to be found in classrooms where a wide variety of activities occur throughout the day, when exploratory materials are available, and where children can choose their own groupings. If the adults interact with two children asking questions and making comments about the task, the children seem to be encouraged to join each other in cooperative tasks. In classrooms where textbooks and workbooks (which a child uses by himself) are used a great deal, fewer children are coded as cooperating. (The negative correlation is strong.)

Educators have long recognized the value of a child's asking questions as a primary means to gain information. Previous research indicates that question-asking is positively related to test scores.*

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*Previous SRI observational studies (Stallings, Baker, and Steinmetz, 1972, and Stallings, 1973) report a significant relationship between children asking questions and scores on achievement tests and attitudinal tests.

In our study, we found that first grade children asked more questions where there was a one-to-one relationship of adult with child in classrooms, where adults responded to children's questions, and where adults made general conversational comments to children. Children asked fewer questions in classrooms where adults focused their communication toward a small group.

Our investigations indicate that EDC's Open Education Program, Far West Laboratory's Responsive Educational Program, University of Arizona's Tucson Early Education Model, and High/Scope's Cognitively Oriented Curriculum Model, all of which try to help children become independent and cooperative, have succeeded in their efforts. These Follow Through children are independent and do cooperate more often with each other than do the Non-Follow Through children. The children in the Bank Street College of Education Approach and EDC's Open Education Program display more pleasure and enjoyment than do Non-Follow Through children while children in classrooms using Far West's Responsive Educational Program and University of Arizona's Tucson Early Education Model ask questions more often than do Non-Follow Through children.

2. Test Scores

In a study of 105 first grade and 58 third grade classrooms in Fall 1973, we found that several classroom processes are related to achievement test scores in reading and math (MAT). These are partial correlations, adjusted for entering scores on the Wide Range Achievement Test. First, there is a significant relationship between high test scores and small group instruction for first grade, but large group instruction for third grade.

Second, a significant correlation was found between test scores and stimulus-response-feedback interactions, where the teacher provides a bit of information and asks a question about the information. The child responds, and the teacher immediately lets the child know whether the response is right or wrong. If he is wrong, the child is guided to the correct answer (positive corrective feedback). If he is correct, he

receives praise, a token, or some form of acknowledgment. This positive reinforcement is significantly related to the test scores.

Third, self-instruction and task persistence are correlated with reading and math achievement. Also, in classes where social studies are taught, there is a positive relationship with reading scores. Obviously, reading skills are used in social studies projects, but it is of interest to note that occurrence of the activity is related to reading scores. In addition, the use of instructional materials such as programmed material, Cuisenaire rods, or Montessori materials are positively correlated with math scores.

Variables describing the time per child spent in reading or math activity (either formal or informal) were highly correlated with math and reading achievement. A study of entering ability indicated that amount of time spent in math was more closely related to achievement in third grade classrooms where the entering ability had been lower than in classrooms where the entering ability had been higher. The study of the relationship of praise to achievement in math indicated similar findings. This type of interaction treatment study could be useful in planning educational programs to enhance the learning of children with differing abilities and different age levels. University of Oregon and University of Kansas, both structured models, have the highest scores of all sponsors in first grade reading, and University of Kansas has the highest score in first grade math. In third grade, the University of Oregon has the highest residual gain score of all sponsors in both reading and math.

In general, a low absence rate, high independence, and high scores on Raven's Coloured Progressive Matrices, a test of non-verbal perceptual problem-solving, tend to be associated with the more flexible classroom where a wide variety of materials are used, many different activities occur, and children are allowed to select their own groups and seating part of the time. In these more flexible classrooms, adults interact with children on a one-to-one basis, more open-ended questions are asked, and children show more verbal initiative. Far West, University of Arizona,

Bank Street, High/Scope, and Educational Development Committee, use these processes. For the most part, children in these classrooms have higher scores on the Raven's, lower absence rates, and show more independence than do children in either University of Kansas or University of Oregon, which are classified as structured models.

The Intellectual Achievement Responsibility Success Scale shows a positive correlation with variables describing the more open classrooms. Our results indicate that children from the more flexible classrooms take responsibility for their own success, but not for their failure. Children in classrooms using the more flexible models of University of Arizona and EDC had higher adjusted scores than children in classrooms of other sponsors. Children from the more highly structured classrooms take responsibility for their own failure, but attribute their success to their teacher's competence or other forces outside themselves. University of Kansas and University of Oregon, more structured models, and children in classrooms using those models, have higher adjusted scores than children in other sponsors. Only children in EDC and Non-Follow Through classrooms had positive adjusted scores on both scales.

3. Results of Analysis of Variance Study

Stepwise regressions were computed to assess how much of each child-outcome measurement is explained by the classroom processes. These regressions indicated that the classroom process variables were more predictive of the child behaviors, absence rate, MAT Math scores, the Raven's, and IAR Success and Failure scores than were the entering school test scores. These results of the partial correlations and the stepwise regressions provide compelling evidence that what occurs in classrooms does affect child outcomes.

Our evaluation suggests that it is possible to find out what a teacher can do to bring about desired child behaviors. In the more academically oriented classrooms which use a high rate of drill, practice, and praise and have the children more frequently engaged in reading or

math activities, the gain scores on reading and math are higher. These children also take more responsibility for their failure as tested on the Intellectual Achievement Responsibility Scale. These findirgs are supported by the fact that the sponsors which use these processes in their classrooms (University of Oregon and University of Kansas) also have higher scores on these tests.

In the more open, interdisciplinary classrooms, where a wide variety of activities are occurring, a wide variety of materials are available, children can select their own groupings part of the time, and can engage in activities without adults, children have higher scores on the Raven's perceptual problem-solving test. They are also absent less often, and they take more responsibility for their success as measured on the Intellectual Responsibility Scale. They are more independent, cooperate more often, and ask more questions.*

All of the relationships between instructional events and the behavior of children that I have discussed today were observed in Follow Through classrooms. The educational practices employed here seem to be resulting in predictable and desired outcomes for the children. On the basis of our findings, we conclude that the Follow Through program of planned variation is being implemented, and that the seven sponsored models considered in this report are each working to the advantage of children--not by chance but by careful design.

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*In every outcome measure, a Follow Through sponsor has scores as high as or higher than Non-Follow Through.